Small Business Innovation Research/Small Business Tech Transfer

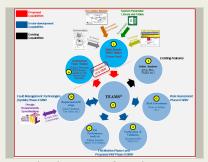
Standardization of Fault Management Techniques and Activities with TEAMS, Phase I



Completed Technology Project (2016 - 2016)

Project Introduction

Fault Management (FM) is a key enabler of system autonomy critical to reducing overall operations costs of increasingly complex science missions while ensuring their success. NASA has invested significant effort and has developed a draft FM Handbook to improve FM design, development, V&V and operations processes. While the FM Handbook provides rules and guidelines, those can be effectively followed for realizing the above mentioned goals with the aid of advanced Model-Based Systems Engineering (MBSE) software tools. NASA uses a variety of such tools to conduct its FM activities. However, these tools are varied and disjoint, and often require manual intervention to transfer data from the output of one tool to the input of another. This process is tedious and error-prone and scales poorly for large, complex systems. This prevents SHM engineers from gaining insight into the overall system level design and characteristics that are key to transparency, verifiability and efficiency of implementing and testing FM. To address these challenges QSI-DST team plans to develop techniques and concomitant software tools to (1) capture diverse and disjoint data products and multi-domain modeling information into TEAMS for standardizing FM Techniques and Activities, (2) conduct Architecture Trade Studies focusing on failure detection (abort trigger) effectiveness with corresponding sensor suite selection, and (3) introduce ancillary capabilities in TEAMS to support the main tasks such as assessment of Failure Effect Propagation timing (FEPT). The proposed effort seeks to aid the evaluation and V&V of FM of system(s) in multiple usage scenarios through utilizing existing capabilities and introducing added capabilities to TEAMS for the computation and evolution of relevant FM analyses. The added capabilities include information integration; extending the system modeling capabilities; and assessing the effect of implementing diagnostic decisions on overall functionality of the system.



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Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Туре	Location
Qualtech Systems, Inc.	Lead Organization	Industry Minority-Owned Business, Small Disadvantaged Business (SDB)	Rocky Hill, Connecticut
Marshall Space Flight Center(MSFC)	Supporting Organization	NASA Center	Huntsville, Alabama

Primary U.S. Work Locations	
Alabama	Connecticut

Project Transitions



Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

Qualtech Systems, Inc.

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

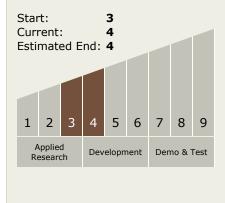
Program Manager:

Carlos Torrez

Principal Investigator:

Sudipto Ghoshal

Technology Maturity (TRL)





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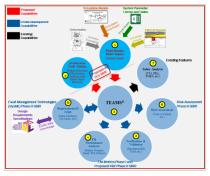


December 2016: Closed out

Closeout Documentation:

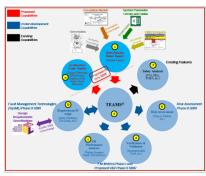
• Final Summary Chart(https://techport.nasa.gov/file/137685)

Images



Briefing Chart Image

Standardization of Fault Management Techniques and Activities with TEAMS, Phase I (https://techport.nasa.gov/imag e/136604)



Final Summary Chart Image

Standardization of Fault
Management Techniques and
Activities with TEAMS, Phase I
Project Image
(https://techport.nasa.gov/imag
e/135361)

Technology Areas

Primary:

- TX11 Software, Modeling, Simulation, and Information Processing
 - □ TX11.4 Information Processing
 - □ TX11.4.1 Science, Engineering, and Mission Data Lifecycle

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System

